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American Petroleum Institute
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# Monthly Statistical Report

Finance, Accounting, and Statistics Department

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## SUMMARY

Reversing the prior month's unusual year-to year decline, total petroleum deliveries rose in November by 1.1 percent. Surprising strength for distillate fuel oil, as well as for gasoline, were at least partly offset by a 6.3 percent decline for kerosine jet fuel and a fall-off in residual fuel oil deliveries of 11.7 percent.

Distillate fuel oil deliveries jumped more than 12 percent over last year's levels, 200-300 thousand B/D over what would have been expected based on recent prior deliveries trends. Given that deliveries of low-sulfur diesel continued at a strong, 1.7 million B/D rate in November, not much less than October's vigorous 1.8 million B/D—and substantially above estimated annual rates of demand for on-highway diesel of 1.4-1.5 million B/D—it seems likely that distillate deliveries' jump in November had more to do with continued adaption to the new regulations for on-highway fuel than anything else.

At refineries, despite slower year-to-year growth in overall activity, production of distillate fuel oil continued strong. Total distillate production rose nearly 8 percent over a year ago, and output of low-sulfur distillate continued at October's high level of 1.8 million B/D. Overall input to distillation units rose only 1 percent from last November.

Meanwhile, domestic crude oil production's decline was moderated by enhancements to Alaskan production facilities as well as the first full month of production from the Point McIntyre field. For November, U.S. petroleum production declined 1.5 percent or a little over 100 thousand B/D. However, for the year to date, domestic crude oil output has still dropped more than 300 thousand B/D or nearly 5 percent.

Total imports jumped 11 percent from last November's levels, despite a decline for products imports. The increase in crude oil imports helped to build crude inventories, which rose 7 million barrels to 339 million barrels at month-end. Distillate stocks also rose by 7 million barrels to 145 million barrels, roughly the same level as a year ago.

*Note: a special analysis of winter distillate supplies begins on page 6.*

## PRODUCT SUPPLIED

### Gasoline

**DELIVERIES LIKELY STRONGER THAN CONSUMPTION.**

Gasoline deliveries rose an unusually strong 3.8 percent in November over levels one year earlier. November's growth, combined with reasonably strong deliveries in recent prior months, means that growth in gasoline deliveries over the past four months has averaged about 3 percent, or roughly 2 percentage points higher than many analysts have been estimating for underlying consumption. It seems highly unlikely that this represents a genuine strengthening in underlying consumption.

Data on highway travel, for example, available through September, have not shown any quickening in growth rates in recent months. September's miles traveled were up 2.8 percent, year to year, well within the 2.5-3.0 percent range of recent prior months. After accounting for the effects of fleet fuel efficiency improvements, this agrees more with the estimated underlying consumption growth rate than with recent deliveries increases.

Oxygenated gasoline deliveries rose from 1.8 million B/D in October to 2.0 million B/D in November, as the remaining regions mandated for winter oxygenated gasoline joined those whose season began in October. As a share of overall gasoline deliveries, oxygenated gasoline accounted for close to 27 percent of deliveries in November, up slightly from 24 percent in October.

### Distillates

**HIGH DELIVERIES CONTINUE FOR LOW SULFUR.**

November's distillate deliveries surged more than 12 percent over year-ago levels, to nearly 3.3 million B/D—their highest November level in fifteen years. November's deliveries were 200-300 thousand B/D above what might have otherwise been expected, based on recent deliveries trends.

Although unusually cold weather can sometimes explain unusual jumps in deliveries, this was hardly the case in November. Nationally, the month was only about 5 percent colder than normal and only slightly colder than a year ago. In fact, in the Northeast, where heating oil consumption is concentrated, November actually averaged slightly warmer than a year ago.

| | API ESTIMATES NOVEMBER | | YEAR-TO-DATE | |
|---|---|---|---|---|
| | Million B/D | Percent Change | Million B/D | Percent Change |
| Total domestic deliveries | 17.4 | 1.1 | 17.1 | 0.5 |
| Crude production | 6.9 | (1.5) | 6.9 | (4.5) |
| Total imports | 8.7 | 11.0 | 8.5 | 7.5 |
| Stocks (million bbl) | 1,095 | 3.2 | na | na |

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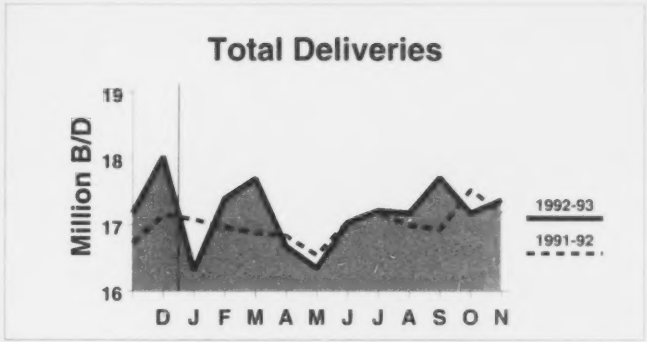
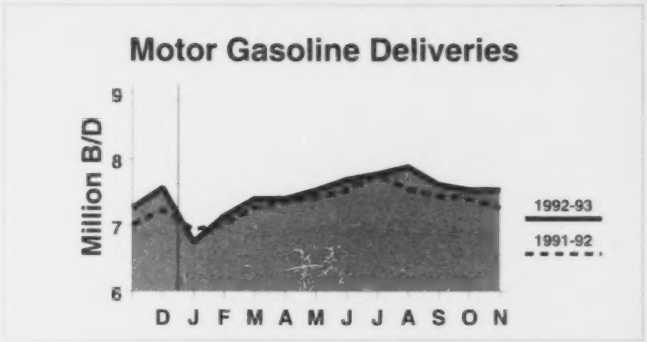
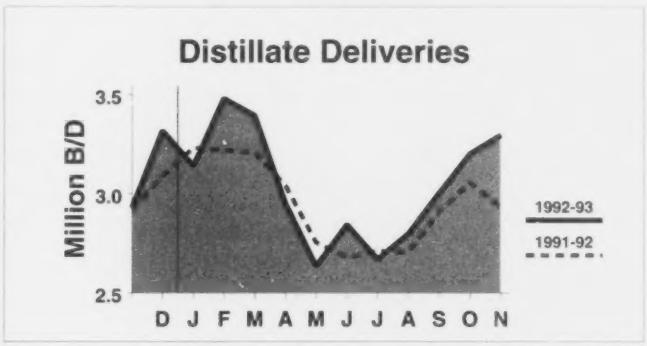
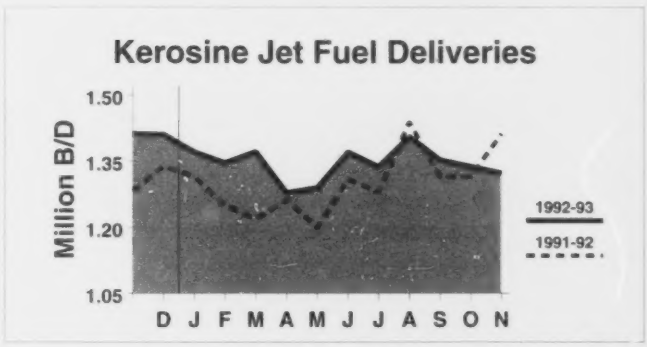



More likely, November's strong deliveries were related to continued adjustment to the new on-highway diesel regulations which became effective October 1 and which apply to nearly half the market for distillate fuel oil. Deliveries of low-sulfur diesel, in particular, continued at a very strong 1.7 million B/D in November, not much less than October's 1.8 million B/D. Deliveries both months were substantially above underlying on-highway consumption, estimated at 1.4-1.5 million B/D on an annual basis. According to Interstate Commerce Commission data, retail prices by month-end had fallen to levels only about 3 cents higher than at the end of September.

**Kerosine Jet Fuel**

**DOWN MORE THAN 6 PERCENT.** November deliveries of jet-kerosine dropped by 89 thousand B/D, or over 6 percent compared to the same period a year ago. While approximately one-third of this decline was attributable to above-trend deliveries last November, the disruption in air travel service due to the strike at American Airlines and a possible decline in jet blending requirements also contributed to the year-to-year decline in jet deliveries.

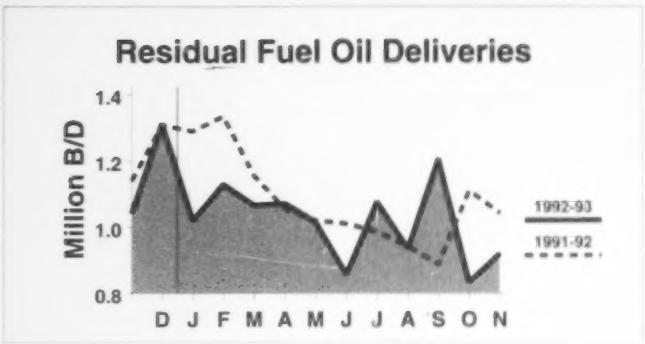
For the past several months, airline industry statistics indicated that the year-to-year growth in miles flown had been relatively flat, increasing only in the 1-2 percent range. Data from the Department of Transportation on jet fuel consumption by U.S. airlines were in concurrence, with the year-to-year growth in fuel consumption averaging about 2 percent. Because of the disruptive effects of the strike of American Airlines, preliminary traffic reports issued by some of the major airlines indicate gains for companies which honored American tickets, but for the industry as a whole it appears that total miles flown decreased by 1-2 percent year-to-year. The decrease in miles flown would have been more severe, but because American continued to fly its cargo runs and to fly partially filled or empty planes in order maintain the positioning of its fleet, the impact on both miles flown and jet deliveries was lessened.

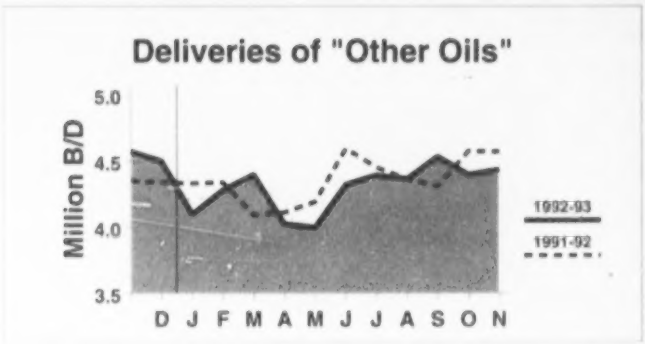
The year-to-year decline in jet fuel deliveries may also have been the result of a decline in incremental blending. Jet fuel is often blended with diesel fuel to prevent crystallization in colder weather as well as to lower the sulfur content of the diesel. However, since some of the colder regions of the nation actually experienced warmer weather this November compared to last and because jet fuel had a 4-5 cents per gallon premium over diesel (which exceeded last November's 1-2 cents premium), it is likely that jet fuel requirements for incremental blending were reduced.

**Residual Fuel Oil**

**DELIVERIES CONTINUE TO SAG.** Warmer temperatures in the Northeast during November as well as high end user stocks tempered any increases in deliveries of residual fuel oil. Even the continued price advantage of resid over natural gas, which was greater during November than in previous months, failed to stimulate a rise in resid deliveries. For the month, deliveries of resid declined by 122 thousand B/D, or 11.7 percent, compared to a year ago. For the year-to-date, resid deliveries were off a lesser 6 percent.

While this November proved to be slightly colder than last for the nation as a whole, both New England and the Mid-Atlantic experienced temperatures that were 3-4 percent warmer than last year. This resulted in electricity generation levels dropping about 1 percent in both those regions. Although state data are not yet available, it appears that in Florida, electricity output for the month was up 2-3 percent compared to the same period a year ago.




With the warmer weather in the Northeast suppressing the demand for electricity output for space heating purposes and already high end user stocks, utilities may have had little additional storage available for incremental purchases. Based on the most recent data available from the Department of Energy, it appears that the surge in resid deliveries during September may have been caused by stock rebuilding by electric utilities. For the month of August, the DOE data showed that resid burn at electric utilities had increased by 70 percent compared to the same month a year ago. This increase resulted in resid stocks held at utilities dropping to their lowest level in 20 years. Given that resid prices were competitive with natural gas and with the impending start date of November 1 for FERC Order No. 636 for the unbundling of natural gas transportation and storage services, it is likely that utilities may have taken advantage of lower resid prices during September to make incremental purchases for inventory build and perhaps to have as an additional source of energy in the event that there were any disruptions in natural gas supply from the start up of FERC Order No. 636.

Even though resid prices continued to decline during November, the combination of moderate temperatures in the Northeast and tight storage capacity constrained buyers' ability to increase purchases. As was the case in October, both the price of resid and natural gas continued to fall during November. For grades of resid containing 1 percent sulfur or less, the average price was $12.25-13.60 per barrel during November, or $1.99-$2.08 per million BTU. For areas such as Florida where it is permissible to use high sulfur resid, the average spot price was even lower, declining to an average of $10.00 per barrel, or $1.59 per million. These lower prices were reflected in the price paid by utilities. Resid price for nearly all major cities in the Northeast were significantly lower than city gate prices for natural gas.

**Other Oils**

**DOWN FOR SECOND MONTH IN A ROW.** Declining for the second month in a row, deliveries of "other oils" fell 3.0 percent for November versus one year earlier. At least part of the reason for the year-to-year decline lies in unusually strong deliveries a year ago for propane, which had been running 100-150 thousand B/D above the recent prior trend. However, even without the anomalies in the year-ago period, deliveries of "other oils" would still have been only about flat for the month.

## SUPPLY

**Production**

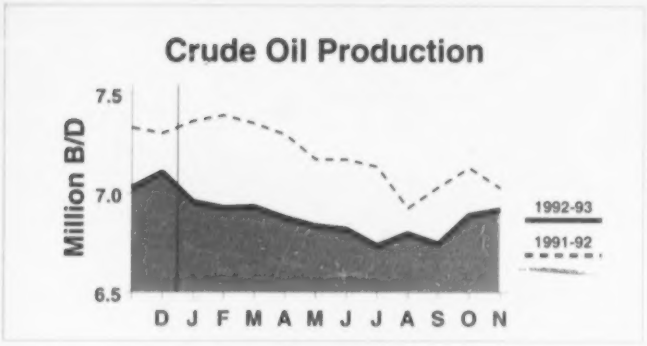
**ALASKAN OUTPUT NEARLY MATCHES YEAR-AGO LEVEL.** Due to a boost to production from the first phase of the GHX-2 gas handling facility, as well as from the recent start-up of production at Point McIntyre, Alaskan production reached 1.67 million B/D in November. This was its highest level since last December and was down only 0.5 percent from a year ago. Completion of the first phase of the North Slope gas-handling installation has added roughly 50 thousand B/D of capacity, and Point McIntyre's first full month of production contributed another 50 thousand B/D or so to November's Alaskan figure.

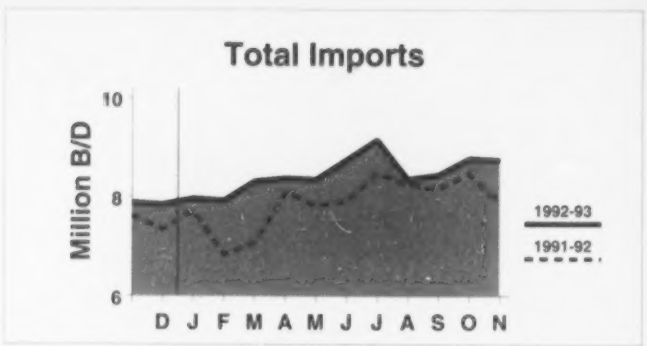
Meanwhile, lower 48 production slipped only about 1.9 percent in November versus one year earlier, so that the decline for all U.S. production amounted to only 1.5 percent or a little over 100 thousand B/D. For the year to date, however, domestic crude oil output has still dropped more than 300 thousand B/D or nearly 5 percent.

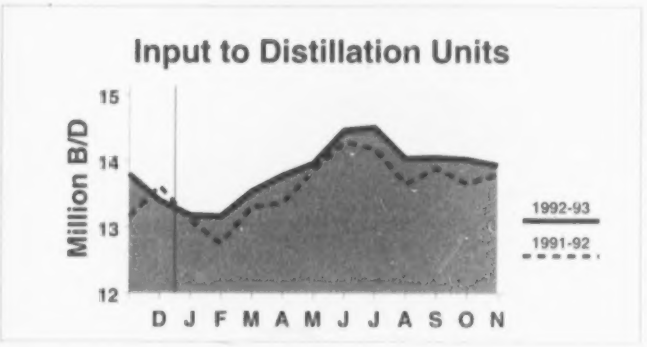
**Imports**

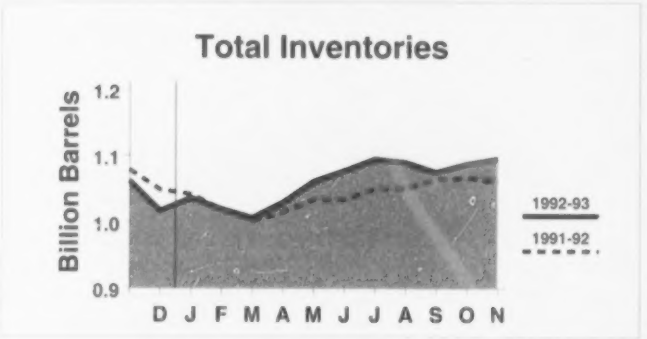
**CRUDE OIL JUMPS, PRODUCTS DECLINE.** Total imports of crude oil and refined petroleum products during November jumped 11.0 percent compared to the same period a year ago. The large, 940 thousand B/D increase in crude oil imports more than offset the 72 thousand B/D decrease in refined product imports, thus accelerating the year-to-date import growth to 7.5 percent. However, with the growth in demand for refined products barely rising and domestic crude oil production declining at rate of 4.5 percent, the year-to-date increase in imports exceeds our estimate of underlying growth of 5 percent, or approximately 400 thousand B/D.

As was the case in October, the only major refined product group with an increase in imports during November was motor gasoline. At 181 thousand B/D, imports of motor gasoline increased 6.5 percent over last November. Imports of residual fuel oil had the largest decrease, dropping nearly 28 percent to 297 thousand B/D. Distillate imports declined over 20 percent to 188 thousand B/D while imports of kerosine-jet fuel declined a lesser 3.6 percent to 84 thousand B/D.




**Refinery Operations**

**GROWTH IN ACTIVITY SLOWS IN NOVEMBER.** Year-to-year growth in refinery inputs, which had been showing gains of 2 to 3 percent in recent months, managed just a 1.0 percent rise in November. Nevertheless, gasoline output, including blending of oxygenates outside of refineries, rose 3.2 percent for the month, and production of oxygenated gasoline alone reached nearly 2.1 million B/D—27 percent of all finished gasoline produced.

As for distillate fuel oil, the strength in distillate deliveries was partially reflected in a 7.8 percent jump in output of this product from last November's level. At 3.49 million B/D, the month's distillate production continued at roughly the same rate as in October, with production in both months being among the highest in fifteen years. Production of low-sulfur diesel continued at October's high level of about 1.8 million B/D, well above estimated underlying consumption of on-highway diesel.

Meanwhile, weaker deliveries for the other major products also showed up in refinery production slates. Kerosine jet fuel production dropped 0.9 percent from last November, its fourth year-to-year decline in a row, while residual fuel oil production dropped 7.2 percent.

**Inventories**

**CRUDE, PRODUCTS BOTH INCREASE.** Inventories of crude oil and major products all rose in November compared with the end of October. For total stocks, the 7 million barrel rise put them at 1.095 billion barrels, up 34 million barrels from one year earlier.

Crude oil stocks, continuing the rise they have experienced since their low this year of 321 million barrels in September, increased 7 million barrels over the month. Nevertheless, November's ending levels of 339 million barrels were not atypical for the month compared with recent prior Novembers.

Distillate stocks' 7 million barrel increase during November put month-end levels at 145 million barrels, nearly the same as a year ago—and last November's distillate stocks had been at the top end of the 120-146 million barrel range of recent Novembers. Despite this November's high level of deliveries for low-sulfur diesel, refinery output was even higher, and inventories of this grade rose 6 million barrels to 63 million barrels. Inventories of high-sulfur distillate, particularly relevant to the heating oil market as the peak of the winter demand season begins, remained at 82 million barrels, matching October's level.

On the East Coast, stocks of all distillate as of the end of November, at 68 million barrels, were the same as last November's. Roughly 80 percent of the East Coast's distillate inventories were of the high-sulfur variety, reflecting the particularly large market share that heating oil use has in this region. Total distillate stocks in the Midwest were also about the same as at the end of last November.

## ESTIMATED UNITED STATES PETROLEUM BALANCE[1]
(Daily average in thousands of 42 gallon barrels)

| Disposition and Supply | November | | | YEAR-TO-DATE | | |
|---|---|---|---|---|---|---|
| | 1993[2] | 1992[3] | % Change | 1993[4] | 1992[3] | % Change |
| **Disposition:** | | | | | | |
| Total motor gasoline | 7,534 | 7,261 | 3.8 | 7,478 | 7,358 | 1.6 |
| *Finished oxygenated* | 2,003 | na | na | 1,080 | na | na |
| *Finished reformulated* | 0 | na | na | 0 | na | na |
| *Finished other* | 5,531 | na | na | 6,398 | na | na |
| Naphtha-jet | 82 | 117 | (29.9) | 117 | 145 | (19.3) |
| Kerosine-jet | 1,322 | 1,411 | (6.3) | 1,344 | 1,301 | 3.3 |
| Distillate fuel oil | 3,294 | 2,929 | 12.5 | 3,033 | 2,948 | 2.9 |
| *≤ 0.05 percent sulfur* | 1,688 | na | na | 715 | na | na |
| *> 0.05 percent sulfur* | 1,606 | na | na | 2,318 | na | na |
| Residual fuel oil | 919 | 1,041 | (11.7) | 1,010 | 1,074 | (6.0) |
| All other oils (including crude losses) | 4,431 | 4,568 | (3.0) | 4,291 | 4,353 | (1.4) |
| Reclassified[5] | -208 | -145 | na | -175 | -163 | na |
| Total domestic products supplied | 17,374 | 17,182 | 1.1 | 17,098 | 17,016 | 0.5 |
| Exports | 940 | 995 | (5.5) | 979 | 923 | 6.1 |
| Total disposition | 18,314 | 18,177 | 0.8 | 18,077 | 17,939 | 0.8 |
| **Supply:** | | | | | | |
| Domestic liquids production: | | | | | | |
| Crude oil (including condensate) | 6,916 | 7,024 | (1.5) | 6,856 | 7,177 | (4.5) |
| Natural gas liquids | 1,850 | 1,754 | 5.5 | 1,753 | 1,693 | 3.5 |
| Other supply[6] | 1,054 | 1,362 | (22.6) | 1,232 | 1,227 | 0.4 |
| Total domestic supply | 9,820 | 10,140 | (3.2) | 9,841 | 10,097 | (2.5) |
| Imports: | | | | | | |
| Crude oil (excluding SPR imports) | 7,061 | 6,121 | 15.4 | 6,697 | 6,086 | 10.0 |
| *From Canada* | 910 | 784 | 16.1 | 888 | 795 | 11.7 |
| *All other* | 6,151 | 5,337 | 15.3 | 5,809 | 5,291 | 9.8 |
| Products | 1,679 | 1,751 | (4.1) | 1,774 | 1,796 | (1.2) |
| *Residual fuel oil* | 297 | 411 | (27.7) | 342 | 365 | (6.3) |
| *All other* | 1,382 | 1,340 | 3.1 | 1,432 | 1,431 | 0.1 |
| Total imports | 8,740 | 7,872 | 11.0 | 8,471 | 7,882 | 7.5 |
| Total supply | 18,560 | 18,012 | 3.0 | 18,312 | 17,979 | 1.9 |
| Stock change, all oils | +246 | -165 | na | +235 | +40 | na |
| **Refinery Operations:** | | | | | | |
| Input to crude distillation units | 13,930 | 13,795 | 1.0 | 13,876 | 13,619 | 1.9 |
| Operable capacity | 15,145 | 15,304 | (1.0) | 15,155 | 15,473 | (2.1) |
| Refinery utilization[7] | 92.0 | 90.1 | na | 91.6 | 88.0 | na |
| Crude oil runs | 13,680 | 13,547 | 1.0 | 13,615 | 13,432 | 1.4 |

| | November 1993 | October 1993 | November 1992 | % Change From | |
|---|---|---|---|---|---|
| | | | | Month Ago | Year ago |
| **Stocks (at month-end, in millions of barrels):** | | | | | |
| Crude oil (excluding SPR stocks) | 338.5 | 332.0 | 325.4 | 2.0 | 4.0 |
| Unfinished oils | 95.6 | 101.6 | 102.3 | (5.9) | (6.6) |
| Total motor gasoline | 221.8 | 210.3 | 213.9 | 5.5 | 3.7 |
| *Finished oxygenated* | 29.5 | 27.3 | na | 8.1 | na |
| *Finished reformulated* | 0.0 | 0.0 | na | na | na |
| *Finished other* | 152.4 | 145.7 | na | 4.6 | na |
| *Blending components* | 39.9 | 37.3 | 37.3 | 7.0 | 7.0 |
| Naphtha-jet | 2.9 | 3.2 | 4.7 | (9.4) | (38.3) |
| Kerosine-jet | 38.4 | 37.5 | 41.5 | 2.4 | (7.5) |
| Distillate fuel oil | 144.6 | 138.1[R] | 146.3 | 4.7 | (1.2) |
| *≤ 0.05 percent sulfur* | 62.7 | 56.5[R] | na | 11.0 | na |
| *> 0.05 percent sulfur* | 81.9 | 81.6[R] | na | 0.4 | na |
| Residual fuel oil | 45.4 | 43.8 | 46.5 | 3.7 | (2.4) |
| All other oils | 208.2 | 221.5[R] | 181.2 | (6.0) | 14.9 |
| Total all oils | 1,095.4 | 1,088.0[R] | 1,061.8 | 0.7 | 3.2 |

**1**—Total supply, i.e., production plus imports adjusted for net stock change is equal to total disposition from primary storage. Total disposition from primary storage less exports equals total domestic products supplied. Information contained in this report is derived from information published in the API *Weekly Statistical Bulletin* and is based on historical analysis of the industry. All data reflect the most current information available to the API and include all previously published revisions. **2**—Based on API estimated data converted to a monthly basis. **3**—Source: U.S. Energy Information Administration (including any adjustments). **4**—Data for most current two months are API estimates. Other data come from U.S. Energy Information Administration (including any adjustments). **5**—An adjustment to avoid double counting resulting from differences in product classifications among different refineries and blenders. **6**—Includes unaccounted-for crude oil, withdrawals from the SPR when they occur, processing gain, field production of other hydrocarbons and alcohol, and downstream blending of ethanol. **7**—Represents "Input to crude oil distillation units" as a percent of "Operable capacity". **R**—Revised.

# WINTER DISTILLATE FUEL OIL SUPPLY CAPABILITY

This article examines distillate supply capability over the peak months of the current heating season. It concludes that, barring unforeseen disruptions, overall supply capability from refineries, primary inventories, and imports appears adequate to meet distillate demand within the range of levels likely to occur.

**Distillate market overview**

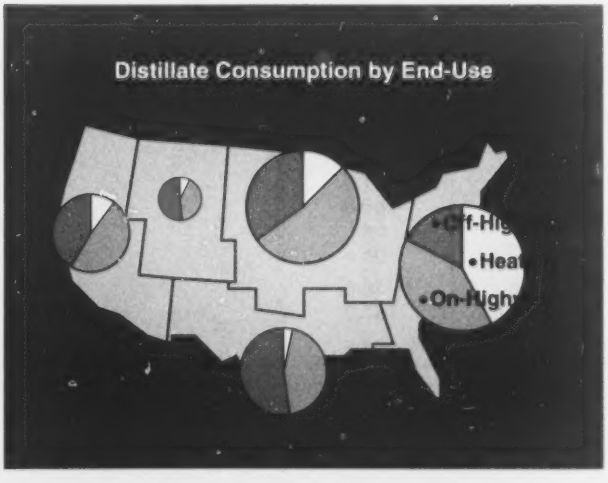
Heating oil makes up only a fifth of overall distillate fuel oil consumption on an annual basis. However, the highly seasonal nature of heating-related use of distillate makes it of particular interest this time of year, since it is responsible for giving distillate demand its seasonal peak. In fact, during the peak of the heating season heating oil can account for half of all distillate use. More than 90 percent of heating oil usage occurs on the East Coast and in the Great Lakes area.

As for the remainder of the distillate market, the largest single sector is on-highway diesel, for which the new low-sulfur requirements, effective October 1, apply. This sector alone accounts for nearly half of distillate deliveries on an annual basis. Other distillate end-use sectors, which, as with heating oil, fall in the high-sulfur category, include industry, farms, railroads, water transportation, and electric utilities.

**Distillate supply**

Looking first at possible demand, industry forecasts have implied deliveries levels from 3.36 to 3.41 million B/D for the next four months (December-March), or roughly 2 to 2.5 percent higher than for the same period last year. Since heating oil demand is obviously weather-sensitive, the effects of a colder-than-normal winter should also be considered. According to our estimates, a 1-in-20 cold winter would boost demand by roughly 120 thousand B/D over this four-month period. Since, over shorter periods, weather tends to deviate more sharply from normal than over the season as a whole, short-term surges in demand could easily be higher.

Taking the high end of the deliveries projections plus the estimated effect of an unusually cold winter yields a high-end scenario of around 3.53 million B/D. This would be about 6 percent above the 3.33 million B/D for the same period a year ago. In other words, in this high-demand scenario, as much as another 200 thousand B/D of additional supply would be needed over last year's levels.




Each of the supply components—refinery output, inventory draws, and imports—will be examined to see what portion of this potential incremental demand could potentially be supplied from each, if necessary. Though the mix of components will depend on economics and logistics, overall potential supply capability appears adequate to meet likely levels of deliveries.

***Refinery production.*** This component has in recent years accounted for an average of 89 percent of distillate supply over the December-March period. Despite the amount of attention often paid to inventories, inventory draws have accounted for only 5 to 12 percent of supplies over the past five December- March periods. Net imports, that is, imports minus exports, have contributed an average of only 2 percent. And, in the most recent three seasons of relatively weak demand, imports have not been called on to contribute anything, on net, to meet domestic demand.

Could refineries supply the additional 200 thousand B/D over last season's deliveries given in the high-demand scenario we have constructed? We believe they could supply a substantial portion, if necessary. Last season, refineries supplied 2.96 million B/D of distillates between December and March. We believe that, based on historical data on refinery runs and yields, that refineries could potentially produce at least an additional 150-250 thousand B/D, or about 3.1 to 3.2 million B/D over this period.

Higher levels of output no doubt could be achieved over shorter periods—in fact, over the past two months, nearly 3.5 million B/D of distillates have been produced. However, it should be noted that after some point, the harder refineries are pushed to produce distillate, the more likely it is that output of gasoline and other products could be hindered. Nevertheless, refinery production could supply a substantial portion of the additional distillate required in an extraordinarily cold winter.

***Inventories.*** As of the beginning of December, inventories of high-sulfur distillate stood at 82 million barrels, out of a total for all distillate fuel oil of 145 million barrels. Because additional heating oil supplies are most likely to come out of the high-sulfur, "off-highway" segment of inventories, a conservative estimate of available supplies from inventories should focus on this portion.

Unfortunately, with little working experience in the new, low- sulfur/high-sulfur environment, estimates of how much high-sulfur inventories could be drawn down over the remainder of the season can only be tentative. Making conservative assumptions about minimum operating levels and making some allowance for the decreased flexibility of logistics under the new, segmented distillate market, a conservative estimate of how far high-sulfur stocks could be drawn would be to a level of about 50 million barrels. This still leaves a potential drawdown of high-sulfur distillate stocks of around 270 thousand B/D over the next four months, more than enough to cover the high-demand scenario being considered here. Low-sulfur distillate stocks could possibly be called on as well, if necessary, although this might in some cases pose logistical problems, and in any event would entail the use of a fuel that is more costly to produce.

It should be pointed out that spreading the potential stock draw over many months understates the amount of distillates that can potentially be supplied from inventory over shorter periods. In fact, distillate inventories are typically drawn down mainly during a few peak months. In recent years inventory draws of as much as 700 thousand B/D in a single month have been experienced.

***Imports.*** Finally, net imports have traditionally provided some additional distillate supplies during the heating season. However, this has not been the case in recent seasons because of weaker domestic demand. For the past three seasons, exports have actually matched or exceeded imports. In other words, the U.S. has been a net exporter of distillates even during the winter season. This suggests that, should domestic demand strengthen, at least part of the increment could potentially be provided through higher imports or lower exports than have been experienced in the recent past.

Although it could be argued that assigning a definitive "capacity" figure to net imports is not meaningful, recent historical levels have often run in the neighborhood of 270-280 thousand B/D during the December-March period. This alone would be more than enough to meet the potential 200 thousand B/D increment in demand.

Thus, barring unforeseen disruptions in supply or distribution, there appears to be enough additional supply capability from refineries, primary inventories, and imports, compared with last season's, to meet levels of demand likely to be experienced.

**Impact of low-sulfur regulations and new tax collection procedures**

Since October 1, diesel for on-highway use has been required by EPA to contain only 0.05 percent sulfur. This is roughly one-fifth of the level that was typical before. Minimum cetane numbers or a ceiling on aromatics content are to be maintained as well, the goal being to reduce particulate emissions. Since on-highway diesel accounts for nearly half of the demand for distillate fuel oil, this rule has had a major impact on the distillate market, and refiners have spent an estimated $3 billion in order to meet the new specifications. California issued even stricter product specifications, although it has granted temporary variances to some refiners and end-users in an effort to smooth the transition.

This is not the first processing challenge refiners have faced in recent years. Some of the others include the phase-down of lead in gasoline since 1973, the overall decline in the quality of crude oil, controls on gasoline volatility beginning in the summer of 1989, the advent of oxygenated fuel requirements last winter—and reformulated gasoline regulations due to be implemented in the next few years. Though these have at times been costly to implement, the refining industry as a whole has met the challenges.

***Market impacts.*** From the standpoint of heating oil, which the law does not require to meet the new lower sulfur limit, the effects of the change are mostly indirect. The existence of two distillate products where there was usually only one before complicates production and distribution logistics.

Further complicating the picture are the new excise tax collection rules of the Internal Revenue Service. In the event of an unexpected surge in heating oil demand, low-sulfur distillate fuel oil could still be sold for off-highway use. But unless it is dyed red, ultimate consumers (or, in the case of sales to state and local governments or farmers, the seller) would have to pay the Federal excise tax—at 24.4 cents per gallon—and then apply for a refund. In addition, because of the higher cost of manufacturing low-sulfur product, there would be an extra cost for refiners and possibly for consumers.

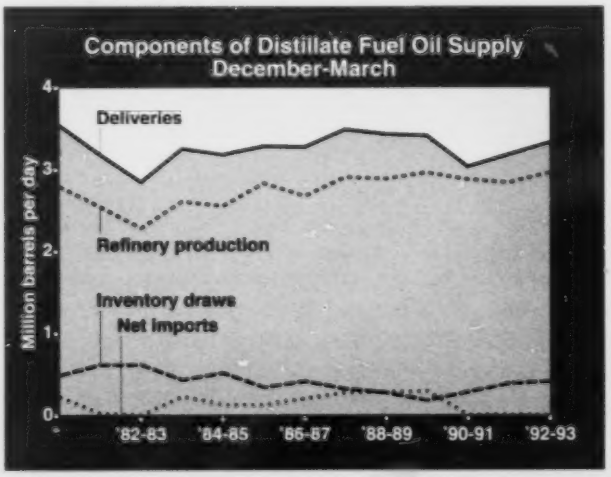
As for the on-highway sector, estimates of refinery capability to produce low-sulfur distillate have been running in the neighborhood of 2 million B/D, while on-highway diesel demand has been estimated at on the order of 1.4-1.5 million B/D. So, from the standpoint of the country's refinery capability to produce low-sulfur diesel, capacity appears adequate. Low-sulfur production over the past two months has averaged 1.8 million B/D, well above estimated demand levels.

***Supply logistics.*** Because of economics and logistics, not every refinery has been modified to produce the new fuel. This makes sense, since, from a business standpoint, this is just another "make or buy" decision for refiners. For those who have the lower-cost possibilities for producing low-sulfur diesel themselves, it makes sense to make the modifications and even sell or exchange additional low-sulfur product with other refiners. But refiners who would have to make the most costly changes would more likely forego the refinery modifications and buy product from the lower-cost producers.

The rule complicates storage and logistics, since before there was usually only one distillate fuel that could be shifted to either diesel or heating use, but now two distinct products exist. Refiners and distributors have been faced with various options. These include constructing new storage, juggling existing storage, or even switching to all low-sulfur diesel. This last option could raise production costs, but it would avoid the costs and logistical headaches of an additional fuel grade.

In any event, subdividing fuel grades, such as has recently been done for distillate, has the effect of increasing the relative volatility of demand in proportion to supply. For example, a sudden cold snap might boost overall distillate demand by, say 5 percent, but measured only against the non-highway portion of distillate, the surge would be more than double that percentage.

In addition, since there are fewer suppliers of low-sulfur distillate than for distillates over all, a problem at one refinery can



have a larger relative impact on supply than in times past. In short, the subdivision of petroleum products into often mutually-exclusive grades reduces the flexibility of the system to respond to unexpected demand or unanticipated supply problems. The result is a greater likelihood of supply/demand imbalances and greater potential market volatility.

**Conclusion**

Barring unforeseen circumstances, distillate supplies from refineries, primary inventories, and net imports appear adequate to meet demand levels likely to occur over the remainder of the winter. However, the segmentation of petroleum product markets by environmental regulations, we believe, reduces supply flexibility and increases the potential market volatility for these products.